TECHNICAL NOTES

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Five-Year Results of a Growing-Stock Density Study in 85-Year-Old White Pine

If Eastern white pine (Pinus strobus) were free of blister rust (Cronartium ribicola) and white-pine weevil (Pissodes strobi), it would be the fastest growing conifer in the Lake States. An example of these high growth rates can be found in the 5-year results of a white pine growing-stock density study in an 85-year-old stand of white pine on the Pike Bay Experimental Forest near Cass Lake, Minn. The white pine is comparatively free of blister rust, and the trees are tall enough so that weevils cause no damage to the merchantable length of the bole.

The stand was released from overhead aspen, birch, and other hardwoods during the winter of 1933-34. Immediately after release there was a rapid acceleration of radial growth. This higher rate of radial growth has continued to the present time. How the early suppression affected height growth is not known, but the present height of dominants and codominants would indicate a site index of 55 feet (at age 50).

In 1954 the stand was divided into four parts, each part being cut to the following densities: 80, 100, 120, or 140 square feet of basal area per acre. Although the study has no formal replication, each stocking level is measured by six to eight 1/5-acre plots. In 1959 the stand was remeasured and each part again cut back to the assigned density.

Both the 1954 and 1959 cuts were essentially from below. In 1954 many suppressed and intermediate trees were removed; these had a high incidence of red rot (Fomes pini). By 1959 the cut was mostly in better intermediates and codominants. These trees were comparatively free of red rot; the exact proportion of defect was not measured but it was less than 5 percent of the total cut volume.

The growth rates in basal area and in board feet (with no deductions for defect) are given in the following table.

(over)

Table 1.--Effects of different stand densities on the 5-year growth rates of 85-year-old white pine

Basal area per acre (square feet)			Board-foot volume per acre[1/]		
When thinned	5 years later	Increase	When thinned	5 years later	Increase
81.0	95.4	14.4	13,170	16,500	3,330
97.8	115.2	17.4	15,900	19,920	4,020
121.3	137.8	16.5	19,730	23,840	4,110
138.1	157.0	18.9	22,450	27,160	4,710

1/ Scribner Decimal C log rule. Includes trees 7.6 inches d.b.h. and larger to a 6-inch top d.i.b.

The board-foot growth rates vary from 670 board feet per acre per year for the 80-square-foot density to 940 board feet for the 140-square-foot level. Although there is an apparent increase in growth rates with increased stand density, internal variation of the several 1/5-acre plots within each treatment would suggest little or no consistent difference between the 100-, 120-, or 140-square-foot levels. Although the 80-square-foot level shows less growth, further experimentation is needed for confirmation, for here again there is much internal variation of growth rates.

Normal yield tables for unmanaged white pine would suggest that this stand is already 10 to 20 years past the culmination of periodic board-foot increment. One can only speculate about how much higher the periodic annual increment would be in managed stands at the time of culmination. Likewise one must speculate about the rotation-long yield from such managed stands. But this small experiment and the rather limited amount of published material available indicate that in managed stands of white pine are found the highest growth rates of any of the northern conifers. The management possibilities of white pine are truly impressive when blister rust and white-pine weevils are not serious problems.

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